WHAT IS CLAIMED IS:

1. An alignment apparatus which generates a driving force between a plate-like movable element and a stator facing the movable element to control alignment of the movable element, comprising:

movable element magnets which are arrayed in a plate-like plane of the movable element in accordance with an array cycle and are magnetized in predetermined directions;

stator coils which are arrayed at intervals corresponding to the array cycle; and

a current controller which supplies control currents having phase differences to each pair of adjacent ones of said stator coils to generate a driving force for driving the movable element between said movable element magnets and said stator coils facing said movable element magnets.

2. The apparatus according to claim 1, wherein said stator coils are formed by stacking plurality of first layers and plurality of second layers,

each of the first layers comprising stator coils whose linear portions are arranged to extend in a first direction, and

each of the second layers comprising stator coils whose linear portions are arranged to extend in a second direction perpendicular to the first direction.

3. The apparatus according to claim 2, wher in the

stator coil which constitutes one of the first and second layers generates a driving force with one degree of freedom between said movable element magnet and the stator coil facing said movable element magnet on the basis of the control current.

4. The apparatus according to claim 2, wherein said current controller supplies control currents having different polarities to the stator coils which constitute one of the first and second layers to generate translational and rotational driving forces with two degrees of freedom between said movable element magnets and the stator coils facing said movable element magnets.

5. The apparatus according to claim 1, wherein said stator coils formed by stacking three pairs of the first and second layers generate translational driving forces with three degrees of freedom and rotational driving forces with three degrees of freedom between said movable element magnets and the stator coils of each layer facing said movable element magnets on the basis of the control currents.

6. The apparatus according to claim 1, wherein an array of said movable element magnets include a plurality of defective portions which have no magnets.

7. The apparatus according to claim 1, wherein the plate-like movabl element has

a first region in which some of said movable

element magnets are arrayed in the plane of the movable element; and

a plurality of projecting regions which externally project from the first region and in which remaining ones of said magnets are so arrayed as to face said stator coils.

8. The apparatus according to claim 6, wherein either of the projecting regions and defective regions are arranged at positions linearly asymmetric with respect to a central portion of the first region.

9. The apparatus according to claim 7, wherein said current controller supplies to said stator coils control currents for generating translational driving forces between said movable element magnets arrayed in the first region and said stator coils facing said movable element magnets to control a position of the movable element.

10. The apparatus according to claim 7, wherein said current controller supplies to said stator coils control currents for generating rotational driving forces between said magnets arrayed in the projecting regions and said stator coils facing said magnets to control a posture of the movable element.

11. The apparatus according to claim 1, further comprising a first partition structure which covers said stator coils and in which a coolant for cooling said stator coils can circulate.

12. The apparatus according to claim 1, further comprising:

first cooling means in which a coolant can circulate; and

second cooling means for transmitting heat of cooling of the coolant to said stator coils through a thermal conductor with which said second cooling means is filled to cool said stator coils.

13. An exposure apparatus comprising:

a first movable stage which holds a first wafer and aligns the first wafer at a predetermined position;

a second movable stage which holds a second wafer and aligns the second wafer at a predetermined position;

first stator coils for driving in a first direction one of said first and second movable stages located in a measurement region for measuring an exposure result;

second stator coils for driving the other of said first and second movable stages located in an exposure region for performing exposure in the first direction independently of said movable stage in the measurement region;

third stator coils for independently driving said first and second movable stages in a second direction perp ndicular to the first direction; and

curr nt control means for supplying to said first

to third stator coils control currents having phase differences to generate driving forces between movable element magnets of said first and second movable stages and said stator coils facing the movable element magnets.

14. The apparatus according to claim 13, wherein each of said first and second movable stages has movable element magnets arrayed in accordance with an array cycle and magnetized in predetermined directions.

15. The apparatus according to claim 13, wherein said first to third stator coils are arrayed at intervals corresponding to the array cycle.

16. The apparatus according to claim 13, wherein said third stator coils have a region in which longitudinally divided stator coils are arrayed to generate driving forces for independently driving said first and second movable stages in the second direction.

17. The apparatus according to claim 13, wherein

said first and second stator coils form a first layer including coils whose linear portions extend in the second direction,

said third stator coils form a second layer including coils whose linear portions extend in the first direction, and

ach of the first and second layers has one of two and three layers.

18. The apparatus according to claim 13, further comprising a first partition structure which covers said first to third stator coils and in which a coolant for cooling said stator coils can circulate.

19. The apparatus according to claim 13, further comprising:

first cooling means in which a coolant can circulate; and

second cooling means for transmitting heat of cooling of the coolant to said first to third stator coils through a thermal conductor with which said second cooling means is filled to cool said first to third stator coils.

20. A device manufacturing method comprising:

a step of applying a photosensitive agent to a substrate;

a step of exposing the substrate by an exposure apparatus; and

a step of developing the substrate,

wherein the exposure apparatus has

a first movable stage which holds a first wafer and aligns the first wafer at a predetermined position,

a second movable stage which holds a second wafer and aligns the second wafer at a predetermined position,

a first stator coil for driving in a first direction one of the first and second movabl stages

located in a measurement region for measuring an exposure result,

a second stator coil for driving the other of the first and second movable stages located in an exposure region for performing exposure in the first direction independently of the movable stage in the measurement region,

a third stator coil for independently driving the first and second movable stages in a second direction perpendicular to the first direction, and

current control means for supplying to the first to third stator coils control currents having phase differences to generate driving forces between movable element magnets of the first and second movable stages and the stator coils facing the movable element magnets.